PEACE/WILLISTON
FISH & WILDLIFE
COMPENSATION
PROGRAM

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A Reconnaissance Survey Of Little Calais Lake

A. R. McLean
1992

PWFWCP Report No. 112

105-02832/

The Peace/Williston Fish & Wildlife Compensation Program is a cooperative venture of BC Hydro and the provincial fish and wildlife management agencies, supported by funding from BC Hydro. The Program was established to enhance and protect fish and wildlife resources affected by the construction of the W.A.C. Bennett and Peace Canyon dams on the Peace River, and the subsequent creation of the Williston and Dinosaur Reservoirs.

Peace/Williston Fish and Wildlife Compensation Program, 1011 Fourth Ave. 3rd Floor, Prince George B.C. V2L 3H9

Website: *www.bchydro.bc.ca/environment/initiatives/pwcp/*

This report has been approved by the Peace/Williston Fish and Wildlife Compensation Program Fish Technical Committee.

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A RECONNAISSANCE SURVEY OF

LITTLE CALAIS LAKE

WATERSHED:	Parsnip River
DATE OF SURVEY:	June 9. 10. 1992
FIELD CREW LEADER:	A.R. McLean
FIELD ASSISTANT:	M. Hunter

PEACE FISHERIES COMPENSATION PROGRAM

B. C. HYDRO

ENVIRONMENTAL RESOURCES

and

B.C. ENVIRONMENT

FISH AND WILDLIFE BRANCH

REPORT PREPARED BY: A.R. McLean

RELEASED BY: _____

D.H.G. Ableson, Regional Fisheries Biologist

OMINECA MOUNTAINS
Germansen Landing
Manson Creek
RANGES
Tchentlo
Chuchi
Lake
Trembleur
STUART LAKE
FORT ST. JAMES
Scale 1:600 000

LAKE: LITTLE CALAIS **SYSTEM NAME: Unnamed C.**

A.S.A.P. REFERENCE NO.: **SYSTEM NO: 237-7011-355-000**

DATA ON FILE FOR THIS SURVEY

Location	x	Dissolved O2/Temp. Profiles	x
Physical Data	x	Winter Dissolved 02/Temp. Profiles	x
Bench Mark	x	Netting Record	x
Terrain Features	x	Lake Catch Summary	x
Access	x	Individual Fish Data	
Resorts and Campsites	x	Fish Preserved	
Other Developments	x	Stomach Analysis	
Obstructions and Pollutions	x	Scale Reading	
Special Restrictions	x	Location of Inventory Sites	x
Aquatic Plants	x	Photograph Directory	x
Wildlife Observations	x	Appendices:	
Miscellaneous Comments	x	A: Water Chemistry Analysis	x
Lake Drainage	x	B: Tributary Stream Data	x
Fisheries Management Comments	x	Bathymetric Map Reduction	x
History of Previous Surveys	x	Bathymetric Map	x
Water Chemistry Summary	x		

LOCATION

Location:	130 km northwest of Fort St. James		
Elevation:	1025 m +/-		
Latitude/Longitude:	55°25'00":125°23'13"	U.T.M.:	10.3489.61437
Management Unit:	7-28	N.T.S. Map No.:	93-N/6

Drainage: Unnamed C. --> Calais L. --> Unnamed C. --> Albert L. --> Unnamed C. --> Electra L --> Brûlé C. --> Nation R. --> Williston Reservoir (Parsnip Reach) --> Peace R.

PHYSICAL DATA

Lake Drainage Area:	--	km^2	Volume:	867000	m^3
Water Surface Area:	156,500	m^2	Flushing Rate:	--	
Area above 6 m contour:	91600	m^2	Perimeter of Islands:	--	m
Shoreline Perimeter:	4000	m	Number of Islands:		0
Maximum Depth:	14.8	m	Mean Depth:	5.5	m
Filterable Residue (TDS):	64	mg/l	Secchi Reading:	4.36	m

Sounding Device: Lowrance X-15 Elevation Source: Contour interpolation

BENCHMARK

(Iron spike, center of red circle) located 3.0 from water's edge on the northwest shore in a 30 cm diameter spruce tree.

High water mark: Lake appears to be at maximum pondage.

Lake: **LITTLE CALAIS**

TERRAIN FEATURES

Immediate Shoreline:

The lake shore slope is moderate to steep on the west and east sides, and low sloping on the north and south. Little Calais Lake is treed to water's edge (lodgepole pine, subalpine fir with spruce sparsely intermixed). A fringe of alder fronts the shoreline. The marshes located at the north and south ends of the lake consist of sedgegrasses, alder, lodgepole pine, subalpine fir and willow. Shoreline substrate consists of fines, organics, large cobble, boulders and bedrock. Lake bottom drops off sharply on the west side, moderately on the east side and gradually at either ends. Two exposed bedrock bluffs are visible on the northwest lake shore. Exposed boulders are present on the lake. Boating access is marginal.

Surrounding Country:

Little Calais Lake is surrounded by rolling terrain to the north and west and mountainous terrain to the east and south. Forest cover is complete and mature, consisting of lodgepole pine, alpine fir with spruce sparsely intermixed throughout. Little Calais Lake is situated within the sub-boreal spruce biogeoclimatic zone.

Lake: **LITTLE CALAIS**

ACCESS

Directions:

Little Calais Lake is a 15 minute helicopter flight from Tchentlo Lake Lodge.

Road Type and Conditions:

N/A

Restrictions:

None noted.

RESORTS AND CAMPSITES

None, but a campsite may be best suited to the low sloping southwest and southeast ends of the lake.

OTHER DEVELOPMENTS

None.

Lake: **LITTLE CALAIS**

OBSTRUCTIONS AND POLLUTIONS

None.

SPECIAL RESTRICTIONS

None.

AQUATIC PLANTS

Sedgegrasses were sparsely located around the lake. No samples were collected.

WILDLIFE OBSERVATIONS

1 beaver

moose tracks/scat

1 loon

3 gulls

MISCELLANEOUS COMMENTS

Snow still present in forested areas.

Bathymetric map: The lake outline is from an enlargement of aerial photograph B.C. 7160 No. 285, flown June, 1969.

Lake: **LITTLE CALAIS**

LAKE DRAINAGE

General:

Little Calais Lake has 4 inlets and 1 outlet. The outlet flows 17 km south-south east through Calais Lake, Albert Lake and Electra Lake, eventually draining into the Nation River.

Major Systems:

None.

Minor Systems:

Unnamed C. - inlet #1

The initial 300 m of this inlet was investigated. Draining into the south end of the lake, this creek had an average wetted width of 4.0 m, average depth of 0.23 m, a water temperature of 5.5° C and gradient of 2%, approx. 100 m upstream from the lake. This initial section of stream affords good spawning habitat and moderate rearing habitat (LOD, undercut banks, instream vegetation, overstream vegetation). At approx. 250 m upstream from the lake, the creek had an average wetted width of 3.0 m, average depth of 0.4 m, a water temperature of 5.5° C and a gradient of 2%. This section of stream had moderate spawning substrate, but a high fines content (30%). Moderate rearing habitat was also noted (LOD, undercut banks, instream vegetation, overstream vegetation).

Refer to point sample cards for additional information.

Lake: **LITTLE CALAIS**

Unnamed C. - intermittent inlet #2

The initial 200 m of this inlet was investigated. Draining into the north end of the lake, this creek had an average wetted width of 1.0 m, average depth of 0.2 m, a gradient of 1.5% and a water temperature of 9.5°C, approx. 12 m upstream from the lake. This seasonal braided creek has an organic substrate, affording no spawning potential.

Unnamed C. - intermittent inlets (2)

Two additional intermittent inlets afford no fisheries potential.

Unnamed C. - outlet

A breached beaver dam, approx. 1 50 m in width by 35 cm in height, is located at the outlet. A second dam (approx. 60 m in width by 20 cm in height) is located 300 m downstream from the lake (at Calais Lake). The outlet creek flows south 300 m to Calais Lake. It has an average wetted width of 25 m, average depth of 1.5 m, a water temperature of 9.5°C and field gradient of 0.1 %. This meandering outlet has no spawning potential but affords good rearing potential (LOD, instream vegetation, overstream vegetation, undercut banks).

Lake: **LITTLE CALAIS**

FISHERIES MANAGEMENT COMMENTS

In order to establish an Arctic grayling "refuge" lake, permission was obtained (from the Provincial Transplant Committee) to transplant 100 Arctic grayling from the Nation River into a small lake within the Nation River Watershed.

Little Calais Lake was investigated to determine the lake's capability of supporting an Arctic grayling "refuge" population. The lake's location (within the Nation River Watershed), small nature, potential lack of competitive fish species, and potential spawning availability were the reasons this lake was selected for investigation. The B.C. Forest Service (Fort St. James) has agreed to place a Recreation Map Notation (Exhibit "A") around the lake, with a stipulation that the Fish and Wildlife Branch (Prince George) be contacted if any land use conflicts arise in the area.

Two overnight net sets and two minnow traps yielded 53 coarse and 33 longnose suckers. Inlet #1 has moderate to good spawning habitat and moderate rearing habitat. Dissolved oxygen measurements taken during the winter of 1991/92 were sufficient to support a fish population.

Little Calais Lake is an ideal candidate for an Arctic grayling introduction. The small nature of the lake may concentrate the population, however some grayling will inevitably be lost through the breached beaver dam at the outlet, potentially populating lakes and rivers downstream. Trap installation is possible approx. 50 m upstream from the lake (bank height 40-50 cm) on inlet #1.

Post Survey Note: Sixty two Arctic grayling were transplanted from the Nation River into Little Calais Lake on July 23, 1992. They were placed in the south end of the lake near inlet # 1 (see photograph) as this was the only safe location for a helicopter to land. A second Arctic grayling transplant is scheduled for July, 1993.

Lake: **LITTLE CALAIS**

HISTORY OF PREVIOUS SURVEYS

Lake Surveys:

An oxygen/temperature series was collected on March 4, 1992 by A.R. Langston and A.R. McLean, Peace Fisheries Compensation Program, Prince George, B.C.

Other Related Surveys:

None known.

Lake: **LITTLE CALAIS**

WATER CHEMISTRY SUMMARY **Limnology Station No. 1**

Field Conditions:

Date:	June 11, 1992		
Time:	0920 hrs	Air Temperature:	11.0 °C
Wind Velocity:	5 km/hr	Wind Direction:	north
Cloud Cover:	5/10 o.c.	Surface Condition:	light ripple
Secchi Disc:	4.36 m	Water Colour:	tannic

Method(s) Used:

Dissolved Oxygen:	YSI model 58 oxygen/temperature meter
Water Temperature:	YSI model 58 oxygen/temperature meter
Air Temperature:	Hand-held alcohol thermometer
pH (field):	Digital Ph pocket tester
H2S (field):	Hach H2S field test kit
Laboratory Used:	Zenon Environmental Inc. B.C. Laboratory Services
Water Sampler:	Verticle Alpha Water Bottle (Vandorn)
Substrate Sampler:	Substrate sample not taken

Water Sample Chemistry: SEAM Site No.: Not determined

	Sampling Depths	
	Surface (0 m)	Lower (13.5 m)
Ph (field)	8.4	8.0
Ph (lab)	7.7	7.6
Specific Conductance (lab)	69 umhos/cm	78 umhos/cm
Filterable Residue 105°C (lab)	64 mg/l	70 mg/l
H2S (field)	-- mg/l	0 mg/l

Bottom Depth:	14.2 m
Substrate Sample Depth:	-- m

Note: Lab pH analyzed outside of optional time frame.

Lake: **LITTLE CALAIS**

DATE: June 11, 1992

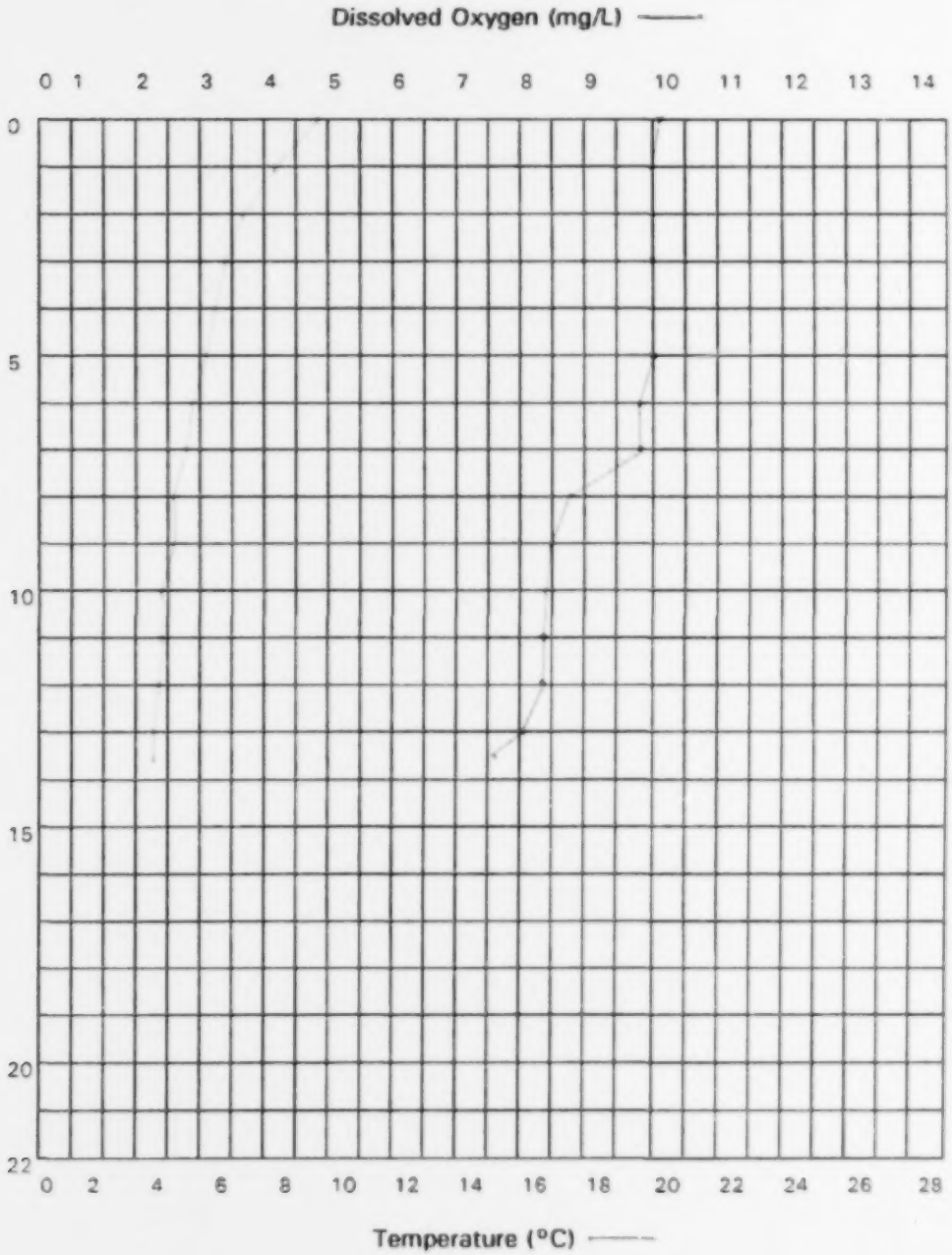
SUMMER OXYGEN/TEMPERATURE DATA

DEPTH (m)	02 (mg/l)	TEMP (°C)
Surface	10.1	8.7
1.0	10.0	7.3
2.0	10.0	6.3
3.0	10.0	5.9
4.0	10.0	5.5
5.0	10.0	5.1
6.0	9.8	4.9
7.0	9.8	4.6
8.0	8.8	4.1
9.0	8.5	4.1
10.0	8.4	3.9
11.0	8.4	3.9
12.0	8.4	3.8
13.0	8.1	3.7
13.5	7.6	3.7
14.2	Bottom	

Lake: LITTLE CALAIS

SUMMER

DISSOLVED OXYGEN AND TEMPERATURE SERIES



Lake: **LITTLE CALAIS**

Date:	March 4, 1992	Crew:	A.R. McLean A.R. Langston
Time:	1016 hrs	Snow depth:	30 cm
Air temp.	8 °C	Ice Depth:	120 cm
Wind:	nil	Weather:	clear/sun

WINTER OXYGEN/TEMPERATURE DATA

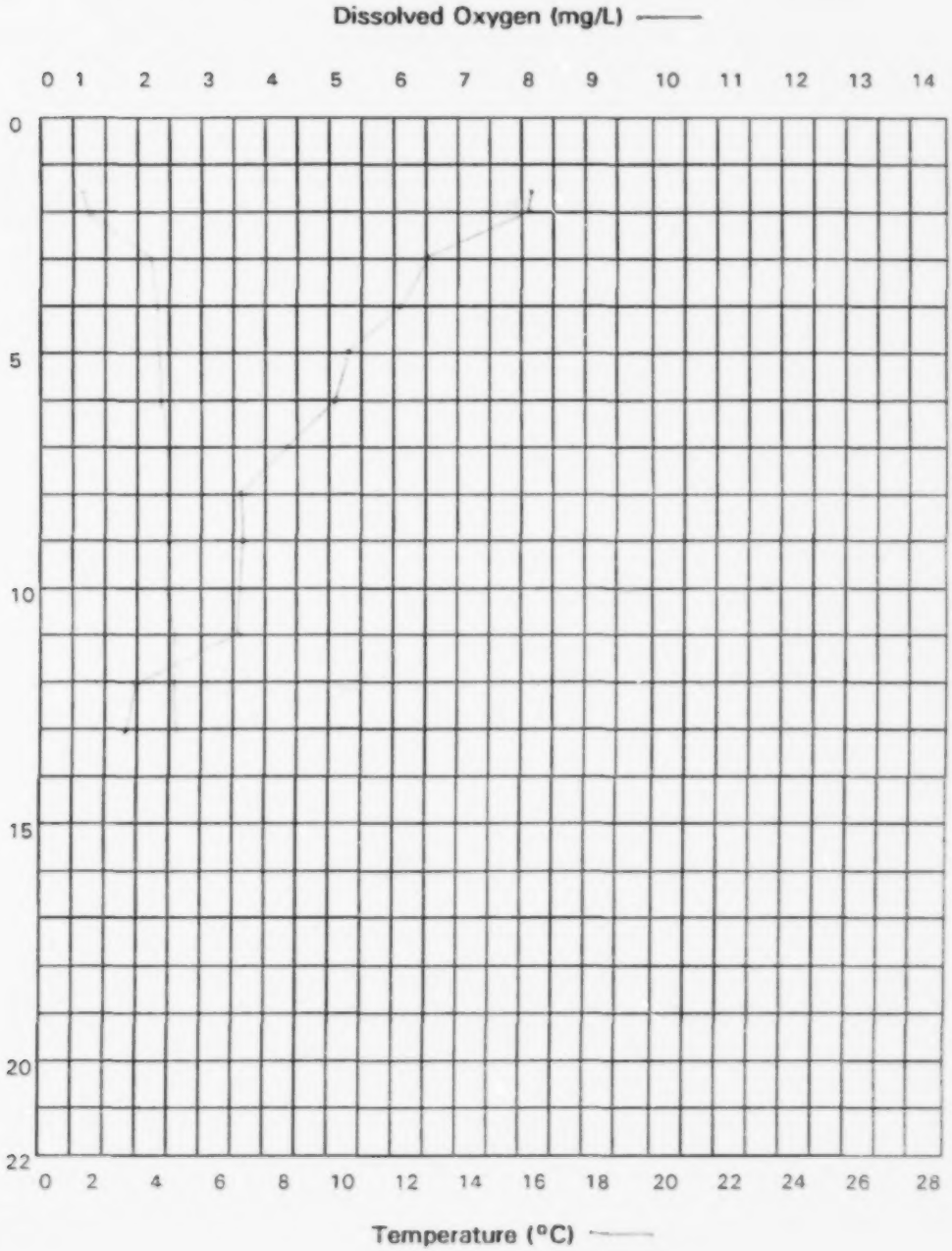
DEPTH (m)	02 (mg/l)	TEMP (°C)
Surface *	-	-
1.5	8.2	1.3
2.0	8.1	1.5
3.0	6.5	3.4
4.0	6.1	3.7
5.0	5.3	3.8
6.0	5.1	3.9
7.0	4.3	4.0
8.0	3.6	4.0
9.0	3.7	4.0
10.0	3.6	4.0
11.0	3.6	4.1
12.0	2.0	4.1
13.0	1.8	4.2
13.4	Bottom	

* Surface is referenced from top of ice, i.e. surface = top of ice.

Lake: LITTLE CALAIS

WINTER

DISSOLVED OXYGEN AND TEMPERATURE SERIES



Lake: **LITTLE CALAIS**

NETTING RECORD

Mesh sizes experimental order: 25, 76, 51, 89, 38, 64 mm

NETTING SITE #1

Type:	Sinking monofilament		
Date Set:	June 9, 1992	Time:	1850 hrs
Date Lifted:	June 10, 1992	Time:	0830 hrs
Net Dimensions:	Length: 91.4 m	Depth:	2.4 m
Shallow End Mesh Size:	25 mm	Depth: Substrate:	1.5 m fines/cobble/ boulder
Deep End Mesh Size:	64 mm	Depth: Substrate:	9.0 m boulder

Comments:

Suckers captured in all panels.

NETTING SITE #2

Type:	Sinking monofilament		
Date Set:	June 9, 1992	Time:	1910 hrs
Date Lifted:	June 10, 1992	Time:	0930 hrs
Net Dimensions:	Length: 91.4 m	Depth:	2.4 m
Shallow End Mesh Size:	25 mm	Depth: Substrate:	1.5 m fines/cobble/ boulder
Deep End Mesh Size:	64 mm	Depth: Substrate:	3.5 m boulder

Comments:

Suckers captured in all panels.

Lake: **LITTLE CALAIS**

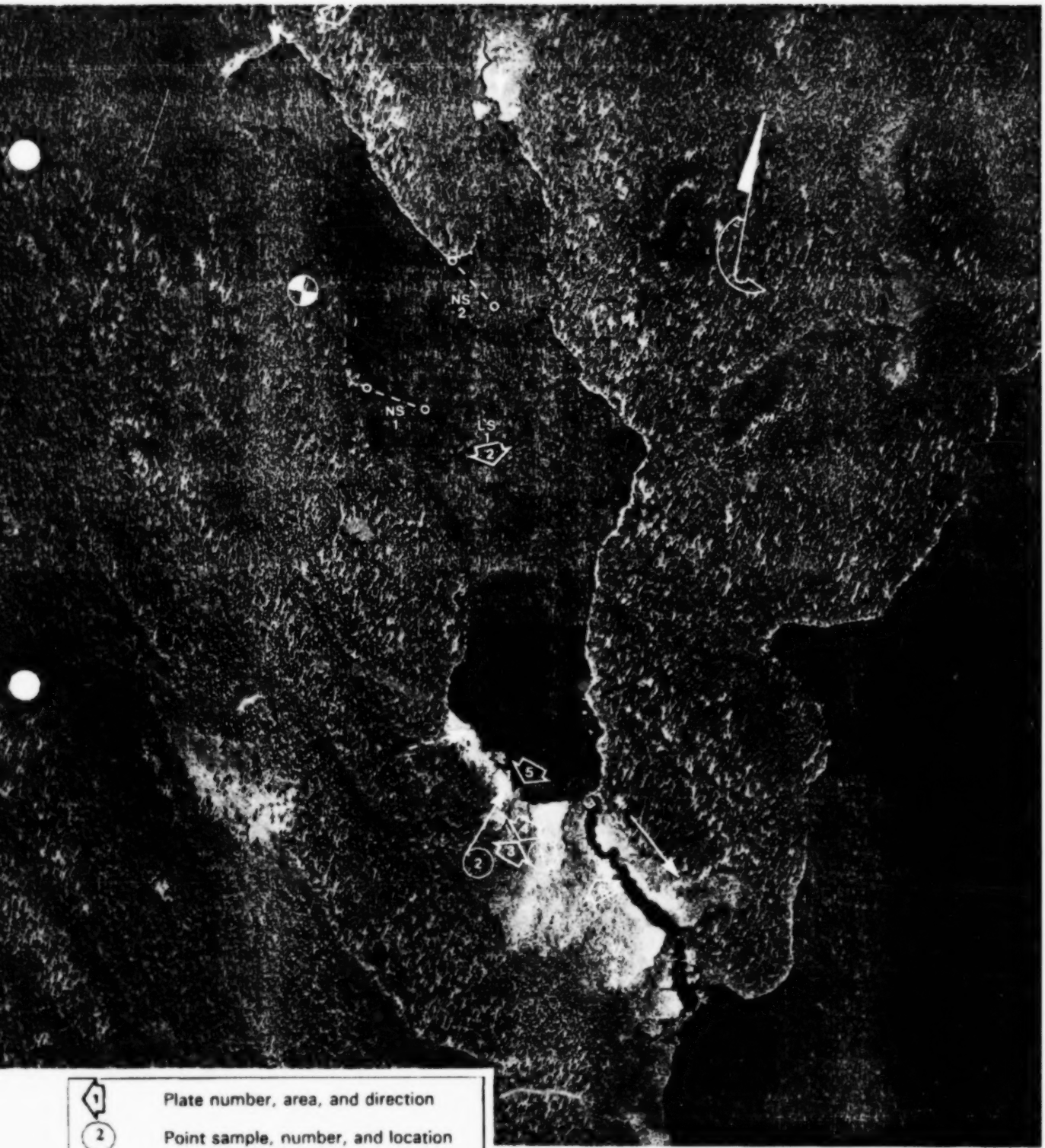
LAKE CATCH SUMMARY

SPECIES	NET SITE NO.				ANGLED	OTHER	TOTAL	NUMBER SAMPLED	NUMBER PRESERVED	SIZE RANGE (cm)
	1	2	3	4						
coarse sucker	13						13			21.0 - 49.0
coarse sucker		40					40			18.0 - 42.0
longnose sucker	10						10			11.0 - 23.0
longnose sucker		22					22			11.0 - 17.0

Minnow Traps:

BAIT: Sardines

#	HOURS	DEPTH (m)	SUBSTRATE	SPECIES	SIZE RANGE (cm)
1	15.25	1.2	organics	1 longnose sucker	7.5
2	15.50	1.0	organics	Nil	



1	Plate number, area, and direction
2	Point sample, number, and location
	Bench mark
LS 1	Limno station location and number
0 - - - 0 NS 1	Netting site location and number
1	Stream flow direction and number

LOCATION OF INVENTORY SITES

Figure 1
Lake: LITTLE CALAIS*
Reference No.: B.C. 7160:285
Reference Date: June, 1969
Scale 1:5500

Lake: **LITTLE CALAIS**

PHOTOGRAPH DIRECTORY

Negative #	Plate #	Description
R4:23	1	Aerial view of Little Calais Lake. Note Calais and Albert Lakes in background. Arrow indicates release site for Arctic grayling.
R6:9A, 10A	2	Panoramic view looking south, taken from middle of lake.
R6:1A	3	Downstream view of sample site #1, taken approx. 100 m upstream from lake on inlet #1.
R6:20	4	Upstream view of sample site #1, taken approx. 100 m upstream from lake on inlet #1.
R6:6A	5	Upstream view of inlet #1, taken from lake.
R5:18	6	Upstream view of outlet, taken approx. 130 m downstream from lake.

Lake: **LITTLE CALAIS**

Plate 1:
Aerial view of Little Calais Lake.
Note Calais and Albert Lakes in background.
Arrow indicates release site for Arctic grayling.

Plate 2: Panoramic view looking south, taken from middle of lake.

Plate 3: Downstream view of sample site #1, taken approx. 100 m upstream from lake on inlet #1

Plate 4: Upstream view of sample site #1, taken approx. 100 m upstream from lake on inlet #1.

Plate 5: Upstream view of inlet #1, taken from lake.

Plate 6: Upstream view of outlet, taken approx. 130 m downstream from lake.

Appendix A

LABORATORY REPORT

Water Chemistry Analysis

B.C. LABORATORY SERVICES
Report for Form 10004021
FISH - PRINCE GEORGE ATTN ALISTER McLEAN
Client Code DD Fisheries

Site NOSITE UNNAMED LAKE

Submitted by (23285) BLACKMAN B

Address (07) Waste Management Branch
Northern Region
3rd Floor, 1011 4th Avenue
Prince George, BC V2L 3H9

Phone No. 565-6944

Audit Sample ( )
Client study reference code ( )
Sampling agency code (91)

Site (NOSITE) UNNAMED LAKE

Sample Adjective ( )
Sample State (FW) Fresh Water
Sample Descriptor (GE) Undefined

This Form was processed to the computer on 15-JUN-1992 as REGULAR
The cost for analyzing samples for this form is

Routine analysis:	$	119.76
Special analysis:	$	0.00
Total	$	119.76

Site NOSITE UNNAMED LAKE

From 92/06/11 0000 To 92/06/11 0000
Depth Range 0.0 0.0 Tide
Sample State Fresh Water
Sample Comment

Parameter Description	Result	Units	Analytical Technique (Sparcode/Medium/Pres'n)
pH	7	pH units	Automated pH Meter (00041200/02/01)
Result 7.7, pH units Analyzed outside of optimal time frame.			
Residue Nonfilt	2	mg/L	Grav. 9 cm Buchner, 105C (00081070/02/01)
Specific Conductance	69	uS/cm	Cond Meter Siebold (00111160/02/01)
Res. Filterable 1.0u	64	mg/L	Gravimetric 1.0u Filter (007M1032/02/01)
Alkalinity Total 4.5	7	mg/L	Automated Electrometer (01021210/02/01)
Result 34.1, mg/L. Analyzed outside of optimal time frame.			

FISH - PRINCE GEORGE ATTN ALLISTER McLEAN **Sample 92011656**
Client Code BD

Site: NOSITE UNNAMED LAKE

From 92/06/11 0000 To 92/06/11 0000
Depth Range : 13.5 12.5 Tide :
Sample State Fresh Water
Sample Comment

Parameter Description	Result	Units	Analytical Technique (Sparcode/Medium/Pres'n)
pH	7	pH units	Automated pH Meter (00041220/02/01)
Result 7.6. pH units Analyzed outside of optimal time frame			
Residue Nonfilt	2	mg/L	Gravi 9 cm Buchner, 105C (00021070/02/01)
Specific Conductance	78	uS/cm	Cond Meter Siebold (00111160/02/01)
Res. Filterable 1.0u	70	mg/L	Gravimetric 1.0u Filter (007H1032/02/01)
Alkalinity Total 4.5	7	mg/L	Automated Electrometer (01021210/02/01)
Result 38.2. mg/L. Analyzed outside of optimal time frame.			

Appendix B

TRIBUTARY STREAM DATA

Lake: **LITTLE CALAIS**

System Name: Unnamed C. **inlet #1**

System No.:

Site Location: Sample Site #1, located approx. 100 m upstream from lake.

Date:	June 10, 1992	Time:	1530 hrs
Channel Width:	5.0 m	Water Temp.:	5.5°C
Wetted Width:	4.0 m	Stage (flow):	high
Max. Depth:	30 cm	Velocity:	1.1 m/sec
Avg. Depth:	23 cm	Field Gradient:	2%
Turbidity:	30 cm	Colour:	slightly tannic

Flood Signs:
Height: 15 cm
Type: woody debris

Substrate Breakdown:

Fines	Small Gravel	Large Gravel	Cobble
10%	20%	70%	--%

Boulder	Bedrock
-- %	-- %

Substrate Compaction: low Sand: 30%

Banks:

	Form	Height	Stability
Right	repose	0.15 m	stable
Left	undercut	0.75 m	stable

Comments:

Velocity measured over 8 m.
Spawning habitat good.
Rearing habitat moderate (LOD, undercut banks, instream vegetation, overstream vegetation).

Lake: **LITTLE CALAIS**

System Name: **Unnamed C.** **inlet #1**

System No.:

Site Location: Sample Site #2, located approx. 250 m upstream from lake.

Date:	June 10, 1992	Time:	1445 hrs
Channel Width:	3.5 m	Water Temp.:	5.5 °C
Wetted Width:	3.0 m	Stage (flow):	high
Max. Depth:	50 cm	Velocity:	0.8 m/sec
Avg. Depth:	40 cm	Field Gradient:	2%
Turbidity:	50 cm	Colour:	slightly tannic

Flood Signs:

Height: 40 cm

Type: woody debris

Substrate Breakdown:

Fines	Small Gravel	Large Gravel	Cobble
30%	40%	30%	--%

Boulder	Bedrock
--%	-- %

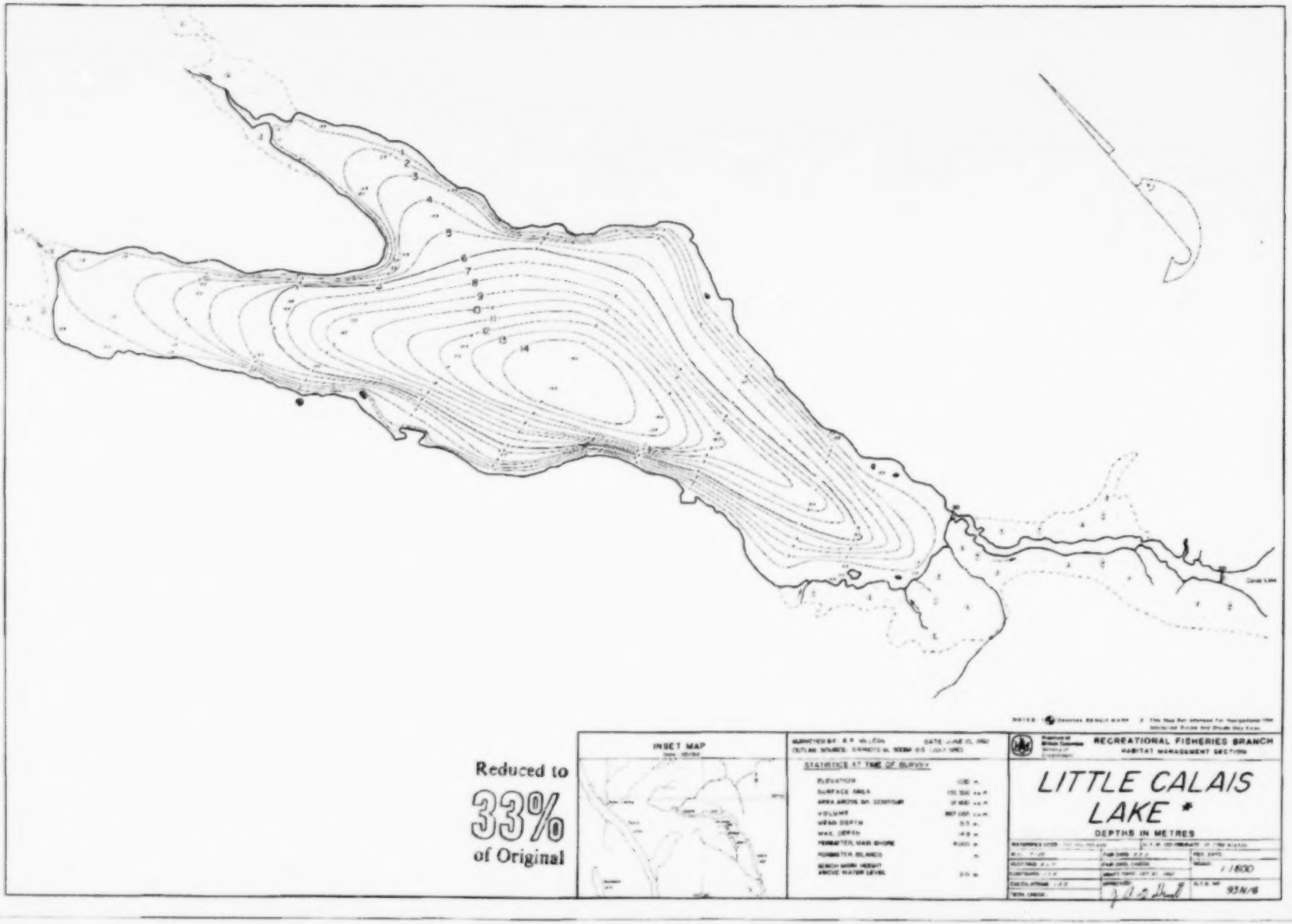
Substrate Compaction: low Sand: 60%

Banks:

	Form	Height	Stability
Right	straight	0.3 m	stable due to rooted vegetation
Left	straight	0.4 m	stable due to rooted vegetation

Comments:

Velocity measured over 5 m.
Moderate spawning (high fines, 30%) and rearing habitat (LOD, undercut banks, instream vegetation, overstream vegetation).



Reduced to 33% of Original